

1. A tool selection method, in a machine tool including a tool rest movable along first and second control axes orthogonal to each other, for automatically selecting a desired tool from a plurality of tools mounted on said tool rest in a parallel arrangement laid in a first control-axis direction with respective tips thereof being oriented in an identical direction, said method comprising:

 setting an inherent standard tip position for said tool rest;

 setting a clearance distance for slightly spacing said tips of said tools from a workpiece during tool selection;

 determining tip distances of all of said tools mounted on said tool rest, each tip distance being defined from said standard tip position to an actual tip position on said tool rest;

 identifying a maximum tip distance among said tip distances, in relation to a currently selected tool as to be firstly used, a next designated tool as to be secondary used and an intermediate tool, if any, disposed between said currently selected tool and said next designated tool, in said all of said tools;

 moving said tool rest in a second control-axis direction, after a machining operation using said currently selected tool is completed, and placing said tool rest at a tool-change starting position where a tip of said currently selected tool is spaced from the workpiece along said second control axis by a distance provided by adding said clearance distance to a difference between said maximum tip distance and a tip distance of said currently selected tool;

 moving said tool rest from said tool-change starting position in said first control-axis direction, and placing said tool rest at a tool-change terminating position where a tip of said next designated

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tool is aligned with the workpiece in said second control-axis direction; and

moving said tool rest from said tool-change terminating position in said second control-axis direction, and placing said tool rest at a tool-selection completing position where said tip of said next designated tool is spaced from the workpiece by said clearance distance along said second control axis.

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2. A tool selection method according to claim 1, wherein identifying said maximum tip distance is carried out during a process of machining the workpiece.

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3. A tool selection method according to claim 1, further comprising, after placing said tool rest at said tool-selection completing position, shifting an origin of a workpiece coordinate system, which has been set at a rotation center of the workpiece in relation to said currently selected tool, by a distance corresponding to a difference between said tip distance of said currently selected tool and a tip distance of said next designated tool in said second control-axis direction, and setting a workpiece coordinate system for said next designated tool.

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4. A tool selection method according to claim 1, further comprising, after determining said tip distances of all of said tools mounted on said tool rest, comparing said tip distances of all of said tools with each other.

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5. A tool selection method according to claim 4, wherein, in a case where all of said tip distances are identical to each other as a result of comparing said tip distances of all of said tools, said maximum tip distance is not identified, said tool rest is moved in said second control-axis direction and is placed at a position at which said tip of said currently selected tool is spaced from said workpiece by a distance corresponding to said clearance distance along said second control axis, and said position is set as said tool-change starting position.

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6. A control device for carrying out a tool selection method according to any one of claims 1 to 5, comprising:

5 a storage section for storing said clearance distance and said tip distances of all of said tools mounted on said tool rest, as inherent data of said tool rest;

10 a processing section for calculating, from said inherent data stored in said storage section, said maximum tip distance as well as said tool-change starting position, said tool-change terminating position and said tool-selection completing position, to issue a position command corresponding to these positions; and

15 a drive control section for controlling, in accordance with said position command issued from said processing section, a feed motion of said tool rest along said first and second control axes.

7. A control device according to claim 6, comprising a numerical control device.

20 8. A numerically controlled lathe provided with a control device according to claim 6.